CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1. A communication system, comprising:

an asynchronous transfer mode (ATM) layer device that supports a plurality of ATM communication channels, each of the plurality of ATM communications channels corresponding to a first class of service or a second class of service;

a plurality of physical layer devices, each of the plurality of physical layer devices having a first channel port associated with the first class of service and a second channel port associated with the second class of service; and

a local interface in communication with the ATM layer device and the plurality of physical layer devices for establishing a plurality of channel connections between each of the plurality of ATM communication channels and the first channel port and the second channel port in each of the plurality of physical layer devices, the local interface having a plurality of addresses;

wherein each of the plurality of channel connections associated with the plurality of second channel ports is via one of the plurality of addresses and at least two of the plurality of channel connections associated with the plurality of first channel ports is via no more than one of the plurality of addresses.

2. The system of claim 1, wherein each of the plurality of ATM communication channels associated with one of the plurality of first channel ports is adapted to carry priority data traffic and each of the plurality of ATM communication channels associated with one of the plurality of second channel ports is adapted to carry non-priority data traffic.

3. The system of claim 2, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

4. The system of claim 2, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combinations thereof.

5. The system of claim 1, wherein the local interface conforms to Universal Test and Operations Physical Interface (UTOPIA) level 2 specification.

6. The system of claim 1, wherein each of the plurality of physical layer devices is adapted to communicate via a first communication channel and a second communication channel with an external physical layer device.

7. The system of claim 6, further comprising an ATM switch that provides the plurality of communication channels to the ATM layer device.

8. The system of claim 7, wherein the ATM switch is implemented in a digital subscriber line access multiplexer (DSLAM).

9. The system of claim 8, wherein each of the plurality of external physical layer devices is provided with digital subscriber loop (DSL) services.

10. A communication system, comprising

an asynchronous transfer mode (ATM) layer device that supports a plurality of ATM communication channels, each of the plurality of ATM communications channels corresponding to a first class of service or a second class of service;

a plurality of physical layer devices, each of the plurality of physical layer devices having a first channel port associated with the first class of service and a second channel port associated with the second class of service;

a first local interface in communication with the ATM layer device and each of the plurality of second channel ports for establishing a first plurality of channel connections, each of the first plurality of channel connections via one of a portion of a plurality of addresses associated with the first local interface;

an address expansion device in communication with the first local interface via the remaining portion of the plurality of addresses; and

a second local interface in communication with the address expansion device and each of the plurality of first channel ports for establishing a second plurality of channel connections, each of the second plurality of channel connections via one of a portion of a plurality of addresses associated with the second local interface.

11. The system of claim 10, wherein each of the plurality of ATM communication channels corresponding to the first class of service is adapted to carry priority data traffic and each of the plurality of ATM communication channels associated the second class of service is adapted to carry non-priority data traffic.

12. The system of claim 11, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

13. The system of claim 11, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combinations thereof.

14. The system of claim 10, wherein the first and second local interfaces conform to Universal Test and Operations Physical Interface (UTOPIA) level 2 specification.

15. The system of claim 10, wherein each of the plurality of physical layer devices is adapted to communicate via the first and second communication channels with an external physical layer device.

16. The system of claim 15, further comprising an ATM switch that provides the plurality of communication channels to the ATM layer device.

17. The system of claim 16, wherein the ATM switch is implemented in a digital subscriber line access multiplexer (DSLAM).

18. The system of claim 17, wherein each of the plurality of physical layer devices provides digital subscriber loop services to the corresponding external physical layer devices.

19. A communication system, comprising:

an ATM layer means for receiving a plurality of ATM communication channels, each of the plurality of ATM communication channels corresponding to a first class of service or a second class of service;

a plurality of physical layer means, each for communicating with an external physical layer device via a first communication channel associated with the first class of service and a second communication channel associated with the second class of service; and

a communication means for interfacing the ATM layer means and the plurality of physical layer means and for establishing a plurality of channel connections between each of the plurality of ATM communication channels and the first and second communication channels associated with each of the plurality of physical layer means, the communication means having a plurality of addresses;

wherein each of the plurality of channel connections associated with each of the plurality of second communication channels is via one of the plurality of addresses and at least two of the plurality of channel connections associated with the plurality of first communication channels is via no more than one of the plurality of addresses.

20. The system of claim 19, wherein each of the plurality of physical layer means is adapted to carry priority data traffic via the first communication channel and non-priority traffic via the second communication channel.

21. The system of claim 20, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic

22. The system of claim 20, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combinations thereof.

23. The system of claim 19, further comprising an ATM switch that provides the plurality of communication channels to the ATM layer device.

24. The system of claim 23, wherein the ATM switch is implemented in a digital subscriber line access multiplexer (DSLAM).

25. The system of claim 24, wherein each of the plurality of physical layer devices provides digital subscriber loop services to the corresponding external physical layer devices.

26. A method for providing communication between an ATM layer device and a plurality of physical layer devices via a local interface having a plurality of addresses, each of the plurality of physical layer devices having a first channel port and a second channel port, comprising:

receiving a plurality of ATM communication channels, a portion of the plurality of ATM communication channels corresponding to a first service class and the remaining channels corresponding to a second service class;

providing a first plurality of channel connections between each of the portion of the plurality of ATM communication channels corresponding to the first service class and one of the plurality of first channel ports, wherein at least two of the first plurality of channel connections is via no more than one of the plurality of addresses; and

providing a second plurality of channel connections between the remaining channels corresponding to the second service class, wherein each of the second plurality of channel connections is via one of the plurality of addresses.

27. The method of claim 26, wherein the first service class corresponds to priority data traffic and the second service class corresponds to non-priority traffic.

28. The method of claim 27, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

29. The method of claim 28, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combinations thereof.

30. The method of claim 26, wherein the plurality of ATM communication channels is received from an ATM switch.

31. The method of claim 30, wherein the ATM switch is implemented in a DSLAM.

32. The method of claim 31, further comprising providing DSL services to an external physical layer device via one of the plurality of physical layer devices.

33. A method for providing communication between an ATM layer device and a plurality of physical layer devices via a local interface having a plurality of addresses, each of the plurality of physical layer devices having a first channel port and a second channel port, comprising:

receiving an ATM cell associated with one of a plurality of ATM communication channels, each of the plurality of ATM communication channels corresponding to either a first class of service or a second class of service;

determining a VPI/VCI value associated with the ATM cell;

based on the VPI/VCI value and a predefined set of rules, determine whether the ATM cell corresponds to the first class of service or the second class of service and determine which of the plurality of addresses on the local interface to which the VPI/VCI value is associated; and

where the ATM cell corresponds to the first class of service, providing the ATM cell to all of the first channel ports via a first unique address on the local interface and where the ATM cell corresponds to the second class of service, providing the ATM cell to one of the second channel ports via a second unique address.

34. The method of claim 33, wherein the first class of service corresponds to priority data traffic and the second class of service corresponds to non-priority traffic.

35. The method of claim 34, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

36. The method of claim 35, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combination thereof.

37. The method of claim 33, wherein the plurality of ATM communication channels is received from an ATM switch.

38. The method of claim 37, wherein the ATM switch is implemented in a DSLAM.

39. The method of claim 38, further comprising providing DSL services to an external physical layer device via one of the plurality of physical layer devices.

40. A method for providing communication between an ATM layer device and a plurality of physical layer devices, each of the plurality of physical layer devices having a first channel port and a second channel port, comprising:

receiving an ATM cell associated with one of a plurality of ATM communication channels, each of the plurality of ATM communication channels corresponding to either a first class of service or a second class of service;

determining a VPI/VCI value associated with the ATM cell;

based on the VPI/VCI value and a first predefined set of rules, determine whether the ATM cell corresponds to the first class of service or the second class of service and determine which of a plurality of addresses on a first local interface to which the VPI/VCI value is associated; and

where the ATM cell corresponds to the first class of service, providing the ATM cell to an address expansion device via a first unique address on the local interface and, based on the VPI/VCI value and a second predefined set of rules, providing the ATM cell to one of the plurality of first channel ports associated with the VPI/VCI value via one of a plurality of addresses on a second local interface connected to the address expansion device and where the ATM cell corresponds to the second class of service, providing the ATM cell to one of the second channel ports via a second unique address on the first local interface.

41. The method of claim 40, wherein the first class of service corresponds to priority data traffic and the second class of service corresponds to non-priority traffic.

42. The method of claim 41, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

43. The method of claim 42, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combinations thereof.

44. The method of claim 40, wherein the plurality of ATM communication channels is received from an ATM switch.

45. The method of claim 44, wherein the ATM switch is implemented in a DSLAM.

46. The method of claim 45, further comprising providing DSL services to an external physical layer device via one of the plurality of physical layer devices.

47. A computer-readable medium for providing communication between an ATM layer device and a plurality of physical layer devices via a local interface having a plurality of addresses, each of the plurality of physical layer devices having a first channel port and a second channel port, comprising:

a first portion of logic for receiving a plurality of ATM communication channels, a portion of the plurality of ATM communication channels corresponding to a first service class and the remaining channels corresponding to a second service class;

a second portion of logic for providing a first plurality of channel connections between each of the portion of the plurality of ATM communication channels corresponding to the first service class and one of the plurality of first channel ports, wherein at least two of the first plurality of channel connections is via no more than one of the plurality of addresses; and

a third portion of logic for providing a second plurality of channel connections between the remaining channels corresponding to the second service class, wherein each of the second plurality of channel connections is via one of the plurality of addresses.

48. The computer-readable medium of claim 47, wherein the first service class corresponds to priority data traffic and the second service class corresponds to non-priority traffic.

49. The computer-readable medium of claim 48, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

50. The computer-readable medium of claim 49, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combinations thereof.

51. The computer-readable medium of claim 47, wherein the plurality of ATM communication channels is received from an ATM switch.

52. The computer-readable medium of claim 51, wherein the ATM switch is implemented in a DSLAM.

53. The computer-readable medium of claim 52, further comprising a fourth portion of logic for providing DSL services to an external physical layer device via one of the plurality of physical layer devices.

54. A computer-readable medium for providing communication between an ATM layer device and a plurality of physical layer devices via a local interface having a plurality of addresses, each of the plurality of physical layer devices having a first channel port and a second channel port, comprising:

a first portion of logic for receiving an ATM cell associated with one of a plurality of ATM communication channels, each of the plurality of ATM communication channels corresponding to either a first class of service or a second class of service;

a second portion of logic for determining a VPI/VCI value associated with the ATM cell;

a third portion of logic for determining, based on the VPI/VCI value and a predefined set of rules, whether the ATM cell corresponds to the first class of service or the second class of service and determine which of the plurality of addresses on the local interface to which the VPI/VCI value is associated; and

a fourth portion of logic for providing the ATM cell to all of the first channel ports via a first unique address on the local interface where the ATM cell corresponds to the first class of service and for providing the ATM cell to one of the second channel ports via a second unique address where the ATM cell corresponds to the second class of service.

55. The computer-readable medium of claim 54, wherein the first class of service corresponds to priority data traffic and the second class of service corresponds to non-priority traffic.

56. The computer-readable medium of claim 55, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

57. The computer-readable medium of claim 56, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combinations thereof.

58. The computer-readable medium of claim 54, wherein the plurality of ATM communication channels is received from an ATM switch.

59. The computer-readable medium of claim 58, wherein the ATM switch is implemented in a DSLAM.

60. The computer-readable medium of claim 59, further comprising a fifth portion of logic for providing DSL services to an external physical layer device via one of the plurality of physical layer devices.

61. A computer-readable medium for providing communication between an ATM layer device and a plurality of physical layer devices, each of the plurality of physical layer devices having a first channel port and a second channel port, comprising:

a first portion of logic for receiving an ATM cell associated with one of a plurality of ATM communication channels, each of the plurality of ATM communication channels corresponding to either a first class of service or a second class of service;

a second portion of logic for determining a VPI/VCI value associated with the ATM cell;

a third portion of logic for determining, based on the VPI/VCI value and a first predefined set of rules, whether the ATM cell corresponds to the first class of service or the second class of service and determine which of a plurality of addresses on a first local interface to which the VPI/VCI value is associated; and

a fourth portion of logic for (i) providing the ATM cell to an address expansion device via a first unique address on the local interface and for providing, based on the VPI/VCI value and a second predefined set of rules, the ATM cell to one of the plurality of first channel ports associated with the VPI/VCI value via one of a plurality of addresses on a second local interface where the ATM cell corresponds to the first class of service and (ii) providing the ATM cell to one of the second channel ports via a second unique address on the first local interface where the ATM cell corresponds to the second class of service.

62. The computer-readable medium of claim 61, wherein the first class of service corresponds to priority data traffic and the second class of service corresponds to non-priority traffic.

63. The computer-readable medium of claim 62, wherein the priority data traffic is real-time traffic and the non-priority data traffic is non-real-time traffic.

64. The computer-readable medium of claim 63, wherein the priority data traffic corresponds to any of the following group of ATM service categories: constant bit rate (CBR), real-time variable bit rate (rt-VBR), non-real-time variable bit rate (nrt-VBR), available bit rate (ABR), unspecified bit rate (UBR), and combination thereof.

65. The computer-readable medium of claim 61, wherein the plurality of ATM communication channels is received from an ATM switch.

66. The computer-readable medium of claim 65, wherein the ATM switch is implemented in a DSLAM.

67. The computer-readable medium of claim 66, further comprising a fifth portion of logic for providing DSL services to an external physical layer device via one of the plurality of physical layer devices.